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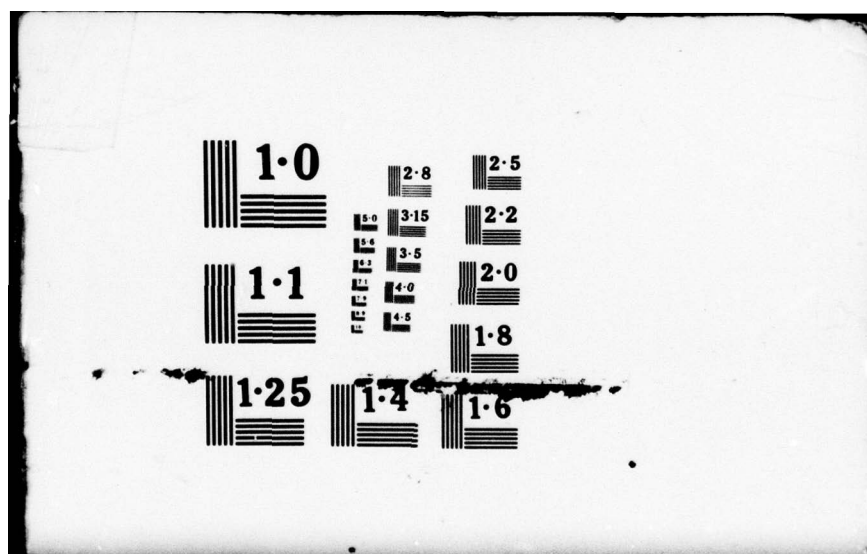
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1. Too often, operational planning proceeds without full consideration of potential environmental effects upon the operation. Enclosure (1) is intended to help the operational planner obtain and apply climatological information. This TACMEMO contains listings of climatological documents indexed by document type and by environmental parameter. The documents are applicable to naval operations within the Pacific Command. They are described and compared so as to help the planner select those documents most useful to him. The TACMEMO also explains how to obtain each document and offers guidance in how to use climatological information in the planning process.

2. This TACMEMO is issued for use and retention in accordance with references (a) and (b). COMTHIRDFLT desires feedback from addressees concerning its usefulness. Comments and recommendations in any form are encouraged. Point of contact is COMTHIRDFLT Geophysics Officer (N33), (808) 472-8242 or AV 421-6923.

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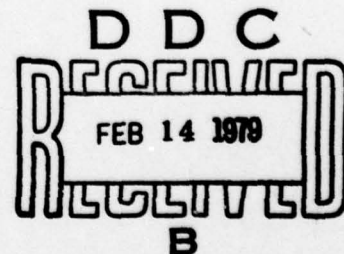
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ABSTRACT

PART I

INTRODUCTION

1. PURPOSE.

1.1. This document is addressed to those who plan naval operations. Its purpose is to promote and facilitate the introduction of climatological considerations into that planning process. It provides aid to the planner in identifying, selecting, and obtaining appropriate climatological data sources, and guidance in the use of the data thus obtained.

1.2. The use of this manual should not discourage or supplant communication between operational planners and Naval Weather Service activities or environmental staff personnel; these remain the primary sources of timely forecasts and expert consultation. Rather, it should aid such communication by providing both information and stimulation.

1.3. The manual identifies and describes a large number of reference publications; in aggregate they would occupy a small library. The manual's intent is to acquaint the planner with these publications and to enable him to select those he may require. It may also aid him in seeking temporary use of some publications, for most of them are held by Naval Weather Service activities and major operational commands.

ABSTRACT

2. SCOPE.

2.1. This manual is a directory of source publications that contain climatological (meteorological and oceanographic) data; it does not itself contain the data. Its scope is limited geographically to publications concerning the Pacific and Indian Oceans, and the two Polar regions. It is also limited to identifying publications containing historical climatology, as opposed to synoptic forecasts. Such forecasts of meteorological and oceanographic conditions are now widely used in the Fleet, and instructions concerning them are fully set forth--especially in DIRNAVOCEANMETINST 3140.1E (U.S. Navy Meteorological and Oceanographic Support Manual). The publications referenced in this manual contain data that provide a historical context within which to assess particular forecasts, to estimate the variability of conditions in an area, and to predict conditions further in the future than synoptic forecasting techniques permit.

2.2. This manual does not address computerized climatological data banks. Several Navy activities maintain excellent data banks. Climatological outlooks provided via Naval Weather Service activities will usually be based on the data bank at Fleet Numerical Weather Central. DIRNAVOCEANMETINST 3140.1E provides further guidance.

3. MANUAL ORGANIZATION.

3.1. General. This manual contains references to 56 climatological publications, 7 publisher's catalogs, and 9 related publications. To enable users to quickly identify publications that may be suitable, Parts II and III contain concise index-type listings. These refer the user to Part IV, which contains detailed descriptions of the contents of the climatological publications. Part V contains instructions for procuring publications from various distributing agencies.

3.2. Organization Rationale. In organizing the manual, it was presumed that a user would usually be interested in a specific geographic area, time frame (season or month), set of environmental parameters, and a particular data presentation format (i.e., graphic, numerical, or narrative). Area and time frame, however, do not serve well for indexing purposes, as nearly all the reference publications cover entire ocean basins (rather than local areas) and contain data for all months or seasons. Thus, the two indexes arrange the publications in categories of publication format type (in Part II) and environmental parameters covered (in Part III). Part III does, however, subdivide the publications pertaining to each parameter into groups by ocean basin.

3.3. Publication Format Categories. Part II contains a listing of all reference publications; each is listed under one of six format categories, which are:

1. Multiparameter Atlases
2. Multiparameter Numerical Tabulations
3. Multiparameter Narrative Descriptions
4. Single Parameter Studies
5. Publisher's Catalogs
6. Related Publications

The entry listing for each publication gives only the publication title, the publisher's identification number (if one is assigned), and a publication reference number.

3.4. Publication Reference Numbers. Each publication is assigned a reference number for use in this manual. It is composed of two numbers separated by a decimal point. The first number indicates the publication format type, from the above list, and the second is merely a serial number within that group. For example, Reference 4.2. is the second Single Parameter Study listed. The reference numbers may be used to simplify finding the description of a publication in Part IV.

3.5. Environmental Parameters Covered. Part III lists specific references for each of 22 environmental parameters. Where there are several references for a given parameter, their differing features are pointed out or compared. The first section of Part III is a quick reference table. It lists the reference numbers of all publications having data regarding each parameter. It also segregates the references by format type and ocean area, and gives the page on which the references are compared or discussed.

3.6. Publication Descriptions. Part IV contains detailed descriptions of the format, contents, size, etc., of each of the climatological publications. It does not include the Publisher's Catalogs or Related Publications, however, as these do not contain environmental data per se. Each description also includes a key number that refers one to the applicable instructions in Part V for ordering the publication.

4. DEFINITION AND USAGE OF TERMS.

4.1. Isopleth. This term refers to lines on a chart along which the value of some parameter remains constant. A familiar example is the family of constant-depth lines on a bathymetric contour chart. The general term isopleth is used in lieu of the more specific isobar, isotherm, etc., as some of these terms may not be familiar to all readers. The physical quantity represented by the isopleth is always indicated by the text. As another convention, a number in parentheses following the word isopleth indicates the contour interval (e.g., "Isopleths (2°C) of sea surface temperature..." indicates a 2°C interval between lines).

4.2. Frequency. Many publications contain presentations of the "relative percentage frequency of occurrence" of some variable. To avoid frequent repetition of this phrase, the single word "frequency" is used in the text. It may always be considered to represent the whole phrase, except in those few instances where the context makes it clear that reference to acoustic frequency is intended. Similarly, "frequency graphs" are histograms of percentage frequency of occurrence, and "frequency isopleths" are contours of constant relative frequency of occurrence.

5. USING CLIMATOLOGICAL DATA IN OPERATIONAL PLANNING.

5.1. General. This section concerns the use of climatological data obtained from the reference publications.

5.1.1. It is well recognized that meteorological and oceanographic conditions vary widely and may heavily influence the effectiveness of any naval operation. But the effectiveness of the operation may well hinge not only on what conditions are actually encountered, but also on how well they were anticipated in planning the operation. Adverse conditions may be avoided, alleviated, or even turned to advantage if the possibility of their occurrence is recognized in advance, suitable plans are prepared, and flexible options are preserved.

5.1.2. For many operations, the primary sources of environmental information are the variety of synoptic forecasts described in Annex H to CINCPACFLT OPCODE 201, and the instructions referenced therein. It is important, however, that climatological data be used to provide a context for these forecasts and to give indication of the variability of parameters about the forecast values. For planning beyond the limited period of synoptic forecast validity (about three days), the use of climatology is essential.

5.2. Procedures. Many aspects of naval operations (such as times, distances, performance measures, etc.) can be characterized numerically. Similarly, environmental parameters have numerical values and probabilities. For comparing limited, well-defined tactical options, a number of methods are known for combining numerical values and probabilities to produce a numerical evaluation of options. But the prospect of using these techniques in planning broader operations is remote. The operations and the environment encompass so many variables, with such complex inter-relationships, that the computations become unmanageable. Thus, the procedures to be set forth here are not mathematical.

Their essential features are that they form a methodical approach to the problem, and place the various steps in an advantageous sequence. Thus, the order of the following steps is an important aspect of their use.

5.2.1. Define Operational Requirements. Most OPORDERS are developed in response to broader implementing directives such as OPLANs and LOIs. It is important at the outset to extract from these broader directives the basic operational requirements and constraints and transform them into a list of key operational factors. The resulting list may be simple or may contain extensive detail, depending on the complexity of the operation. Consideration should be given to clear definition of at least the following factors:

- a. Units involved, their capabilities, sensors, weapons, personnel, interactions.
- b. Time and geographical constraints.
- c. Operational objectives, tactical options.
- d. Anticipated threat; including platforms, sensors, weapons, tactics, constraints.

The objective is to list every aspect of the operation that could be affected in any way by environmental conditions.

5.2.2. Identify Significant Environmental Parameters. To identify these, it may be helpful to use the list used for Part III of this manual. Consider each parameter in turn, and determine if it could have any influence on any aspect of the operation. List the significant parameters, perhaps in rough order of importance.

5.2.3. Determine Parameter Values. For each of the significant environmental parameters, determine its most likely value and the range of values it might have during the operation. For near-term operations, appropriate forecasts give a best estimate of the most likely conditions. For operations to be conducted more than three days in the future, climatological publications identified in this manual give estimates of the most likely conditions. For all operations, however, the possible range of values should be determined from the climatological publications. It may be helpful to estimate the probability that parameter values will be in a certain range, or above or below certain values. These possible values are then to be used in the procedures in the next paragraph.

5.2.4. Estimate Environmental Effects on Operation.

For each parameter in turn, consider what effects it may have on each of the operational factors set out in paragraph 5.2.1. and on the operation as a whole. Consider effects on individual units (including platform, sensors, weapons, other systems, and personnel). Determine what effects there may be on interactions among units, such as communications, UNREPS, and cooperative searches or attacks. The objective of these considerations is to identify those elements of the operation most sensitive to environmental influences and the likelihood that they will be affected unfavorably. Devise alternative plans for those situations. If flexible options are preserved, alternatives may be selected on-scene in response to encountered conditions.

5.2.5. Estimate Environmental Effects on Opponents.

Recall that moderately adverse conditions may be beneficial if they are more detrimental to the threat. Conversely, one may wish to avoid too-favorable conditions if they confer advantage on the opponent (such as good sound propagation may do).

5.2.6. Prepare an Environmental Effects Summary.

Summarize the findings of the above considerations. The summary should highlight particular parameters that may be unfavorable, sensitive units or procedures, and tactical options (along with the conditions in which they would be favored). This summary of environmental effects should then be used in the preparation (or revision) of the operation order.

PART II

PUBLICATION LIST BY FORMAT TYPE

1. GENERAL. This part contains a concise listing of all publications referenced in this manual. This list gives the title and publisher of each, and assigns (along the left-hand margin) a reference number to each publication. The publications are arranged according to their type of format; the format-type categories are defined below. The publications in categories 1-4 contain climatological data, and are described in detail in Part IV of the manual. The Publisher's Catalogs and Related Publications are listed only in this part and are not further described.

1. Multiparameter Atlases. These publications contain maps, charts and other graphic displays of environmental data.
2. Multiparameter Numerical Tabulations. These publications contain entirely tabulated numerical data for both ocean areas and numerous land stations.
3. Multiparameter Narrative Descriptions. These publications contain descriptions of the prevailing patterns and relationships of environmental parameters over areas of varying scope.
4. Single Parameter Studies. These publications generally address a single parameter and vary in geographical scope. The presentations in each are more comprehensive than the corresponding data found in the multiparameter publications.
5. Publisher's Catalogs. These catalogs contain references to publications in addition to those included in this manual. The classified catalogs also provide detailed descriptions of some publications that are listed in this manual but are not described here because of classification.
6. Related Publications. These publications do not contain climatological data, but address related topics such as the physics of environmental phenomena.

1 - Multiparameter Atlases

U.S. Navy Marine Climatic Atlas of the World:

- 1.1 Volume II, North Pacific NAVAIR 50-1C-529 (1977)
- 1.2 Volume III, Indian Ocean NAVAIR 50-1C-530 (1976)
- 1.3 Volume V, South Pacific NAVAER 50-1C-532 (1959)
- 1.4 Volume VI, Arctic NAVWEPS 50-1C-533 (1963)
- 1.5 Volume VII, Antarctic NAVWEPS 50-1C-50 (1965)

- 1.6 Meteorological Atlas of the International Indian Ocean Expedition (Volumes I and II): National Science Foundation (1971)

- 1.7 Oceanographic Atlas of the International Indian Ocean Expedition: National Science Foundation (1971)

Oceanographic Atlas of the Polar Seas:

- 1.8 H.O. Pub. No. 705, Part I (1957) (Antarctic)
- 1.9 H.O. Pub. No. 705, Part II (1958) (Arctic)
- 1.10 Pilot Chart of the North Pacific Ocean: N.O. 55 (Month, Year)
- 1.11 Atlas of Pilot Charts, South Pacific and Indian Oceans: NAVOCEANO Pub. No. 107 (1966)
- 1.12 Climatic Summaries for Major SEVENTH Fleet Ports and Waters: NAVAIR 50-1C-62 (1974)
- 1.13 Climatic Summaries for Major Indian Ocean Ports and Waters: NAVAIR 50-1C-63 (1974)
- 1.14 Sailing Directions (Planning Guide) for the North Pacific Ocean (Appendix A): DMAHC Pub. No. 152

2 - Multiparameter Numerical Tabulations

- 2.1 Summary of Synoptic Meteorological Observations:
U.S. Naval Weather Service Command
- 2.2 Climatic Summaries for Major SEVENTH Fleet Ports and
Waters: NAVAIR 50-1C-62 (1973)
- 2.3 Climatic Summaries for Major Indian Ocean Ports and
Waters: NAVAIR 50-1C-63 (1974)
- 2.4 Climatological Survey of the Pacific: Fleet Weather
Central, Pearl Harbor/14ND-FWC-P-3140/6 (3-69)
- 2.5 U.S. Navy World-Wide Airfield Summaries: Commander
Naval Weather Service

Note: References 2.2 and 2.3 are also listed with the
Multiparameter Atlases because they contain graphic
as well as tabular material.

3 - Multiparameter Narrative Descriptions

- 3.1 Sailing Directions - North Pacific Ocean (Planning Guide): DMAHC Pub. 152 (1972)
- 3.2 National Intelligence Survey, Pacific Basin, Marine Climate and Oceanography (U): NIS 105 (Secret)
- 3.3 National Intelligence Survey, Indian Ocean, Marine Climate and Oceanography (U): NIS 106 (Secret)
- 3.4 Mine Warfare Pilot - (Area) (U): NAVOCEANO SP-(800 Series) (Secret, Confidential)
- 3.5 Environmental Planning Study of the (Area) (U): NAVOCEANO SP-(Series) (Secret, Confidential)
- 3.6 Operational Oceanography of the (Area) for Submariners (U): NAVOCEANO SP-(Series) (Secret, Confidential)

4 - Single Parameter Studies

- 4.1 Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface and Subsurface Layers: NAVOCEANO Reference Publication No. 2 (1976)
- 4.2 Monthly Charts of Mean, Minimum, and Maximum Sea Surface Temperatures of the North Pacific Ocean: NAVOCEANO SP-123 (1969)
- 4.3 Monthly Charts of Mean, Minimum, and Maximum Sea Surface Temperatures of the Indian Ocean: NAVOCEANO SP-99 (1967)
- 4.4 Sound Speed Profiles for the North Pacific Ocean: NUSC Technical Document 5271 (1976)
- 4.5 Sound Speed Profiles for the Indian Ocean: NUSC Tehnical Document 5555 (1976)
- 4.6 Sound Velocity Structure of the North Indian Ocean: NAVOCEANO TR-231 (1972)
- 4.7 Bathymetric Atlas of the North Pacific Ocean: H.O. Pub. 1301-3 (1971)
- 4.8 Seasonal Low Frequency Propagation Loss Classification Charts of the North Pacific and North Atlantic Oceans (U): NAVOCEANO TN 3440-C3-75 (1975) (Confidential)
- 4.9 Sonic Convergence Zone Atlas for the North Pacific Ocean (U): H.O. Pub. No. 253 (1961) (Confidential)
- 4.10 Estimates of Ambient Noise in the Deep Ocean (U): General Oceanology, Inc. Report No. 4 (1968) (Confidential)
- 4.11 Ocean Route Envelopes: PSI Report 1036
- 4.12 Atlas of Sea and Swell Charts: H.O. Pub. No. 799 (Series) (1944)
- 4.13 Wave Climatology as an Aid to Ship Routing: NAVOCEANO TR-219 (Pacific), TR-192 (Indian) (1967-69)
- 4.14 Surface Currents, North Pacific Ocean: NAVOCEANO SP-1402 (Ocean Area Series No.) (1977)

- 4.15 Surface Currents, South Pacific Ocean: NAVOCEANO SP-1403 (Ocean Area Series No.) (1977)
- 4.16 Surface Currents, Indian Ocean: NAVOCEANO SP-1404 (Ocean Area Series No.) (1977)
- 4.17 Ocean Currents in the Vicinity of the Japanese Islands and the China Coast: NAVOCEANO Pub. No. 237 (1964)
- 4.18 Currents in the South China, Java, Celebes, and Sulu Seas: H.O. Pub. No. 236 (1945)
- 4.19 Major Currents Off the West Coasts of North and South America: NAVOCEANO TR-221 (1969)
- 4.20 Surface Sediments and Topography of the North Pacific Ocean: Scripps Institution of Oceanography/IMR-TR (Series) (1972)
- 4.21 High Frequency Bottom Loss Provinces in the Northern Hemisphere (U): NAVOCEANO SP-217 (1976) (Confidential)
- 4.22 Naval Warfare Planning Chart Base - ASW Prediction Areas (U): DMAHC (Series)-2401 (Confidential)
- 4.23 Ice Atlas of the Bering Sea, Sea of Okhotsk, and Sea of Japan (U): N.O.P. 1201 (1974) (Secret)
- 4.24 Components of the 1000 mb Winds of the Northern Hemisphere: NAVAIR 50-1C-51 (1966)
- 4.25 Upper Wind Statistics Charts of the Northern Hemisphere: NAVAER 50-1C-535 (1959)
- 4.26 Climate of the Upper Air (Southern Hemisphere): NAVAIR 50-1C-(Series) (1969-71)
- 4.27 Pacific Ocean Cloudiness From Satellite Observations: University of Hawaii
- 4.28 Study of the World-Wide Occurrence of Fog, Thunderstorms, Supercooled Low Clouds, and Freezing Temperatures: NAVAIR 50-1C-60 (1971)
- 4.29 Mariner's World-Wide Climatic Guide to Tropical Storms at Sea: NAVAIR 50-1C-61 (1974)
- 4.30 Typhoon Havens Handbook for the Western Pacific and Indian Oceans: NEPRF Tech. Paper 5-76 (1976)

5 - Publishers' Catalogs

The first six catalogs listed here are distributed through DMAHC (see Ordering Key V-2). The document identification number shown is the DMAHC stock number.

- 5.1 Catalog of NAVOCEANO Publications: SUPPUB3P
- 5.2 Catalog of Classified NAVOCEANO Publications: SPPUB3P (S)
- 5.3 Numerical Listing of Charts and Publications: CATB1NL
- 5.4 Miscellaneous and Special Purpose Navigational Charts, Sheets, and Tables: CATB1NA
- 5.5 Catalog of Classified Charts and Publications: CATB1NS
- 5.6 Allowance Requirements for Nautical Charts: PUB1NP
- 5.7 Climatic Publications Prepared for the Director, Naval Oceanography and Meteorology (November, 1977)

Available from:

Naval Weather Service Detachment
Asheville, NC 28801

6 - Related Publications

- 6.1 Guide to Standard Weather Summaries and Climate Services: NAVAIR 50-1C-534 (1975)
- 6.2 Effects of the Bottom on ASW Systems: NAVOCEANO TN 3440-C3-76 (1977)
- 6.3 Refraction of Sound in the Sea Floor: NAVOCEANO TN3440-6-75 (1975)
- 6.4 The Acoustic Environment and Tactical Decision-Making: NAVOCEANO SP-221 (1977)
- 6.5 Submarine Sonar Environmental Manual: NAVOCEANO SP-140
- 6.6 U.S. Naval Weather Service Numerical Environmental Products Manual: NAVAIR 50-1G-552 (1975)
- 6.7 ASW Oceanographic and Acoustic Support Products Manual: DIRNAVOCEANMETINST C3160.4 (Confidential) (1976)
- 6.8 Oceanography for Long-Range Sonar Systems: NAVOCEANO SPPUB79
 - Part I - Introduction to Oceanography and Physics of Underwater Sound in the Sea
 - Part III - Deep Water Transmission and Operational Planning
- 6.9 Oceanography and Underwater Sound for Naval Applications: NAVOCEANO/SUPPUB84

PART III

PUBLICATION LIST BY PARAMETER

1. GENERAL.

1.1. This part is directed to the planner wishing to find data concerning specific environmental parameters. It is divided into two sections. The first is a quick reference table arranged by parameter. It identifies, for each parameter, those publications containing relevant data, giving the reference number, publication type and area covered for each. The second section is also arranged by parameter. For each one, it contains a comparative discussion of the publications listed in the table and points out distinguishing features of their contents and format.

1.2. It is noted that no references to the Narrative Description publications are given in the table, and few in the discussion sections. This is because these publications deal primarily with relationships between parameters, generally focus on small, near-shore areas, and do not give single parameter data for broad areas.

2. QUICK REFERENCE TABLE. Table 1 lists, in row sequence, environmental parameters that may influence various naval operations. The number before each parameter name gives the page number for the discussion of publications relating to that parameter. Within each row, x's or publication reference numbers signify publications containing relevant data. The x's indicate that the publication is identified in the column header; the reference number entries identify publications directly. The column group headers identify the publication type and geographic area covered.

TABLE 1
QUICK REFERENCE TABLE

PAGE REF.	PUB TYPE	ATLASES												TABULATIONS				SINGLE PARAMETER STUDIES			
		NP				IN				SP				ANT	W	NP	WP	IN	NP	IN	SP
		1.1	1.10	1.12	1.14	1.2	1.6	1.7	1.13	1.11	1.11	1.3	1.4	1.9	1.5	1.8	2.1	2.5	2.4	2.2	2.3
	REF. NO.	1.1	1.10	1.12	1.14	1.2	1.6	1.7	1.13	1.11	1.11	1.3	1.4	1.9	1.5	1.8	2.1	2.5	2.4	2.2	2.3
III-4	Sea Surf. Temp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
III-4	Subsurf. Temp.							X													
III-5	Mixed Lay. Depth							X													
III-5	Salinity							X													
III-5	Sound Vs. Prof.																				
III-5	Bathymetry																				
III-5	Prop. Loss																				
III-5	Ambient Noise																				
III-6	Ship Density																				
III-6	Act. Acous. Rng.																				
III-6	Sea/Swell	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-6	Currents	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-6	Bottom Type																				
III-7	Sea Ice	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-7	Surf. Air Temp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-7	Surf. Winds	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-7	Upper Winds																				
III-7	Baro. Pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-8	Cloud Cover	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-8	Precipitation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-8	Vis./Ceiling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
III-8	Storms	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

***Area Abbreviation Legend**

NP = North Pacific Ocean

SP = South Pacific Ocean

WP = Western Pacific Ocean

IN = Indian Ocean

ARC = Arctic Region

ANT = Antarctic Region

W = World-Wide

3. DATA SOURCE COMPARISONS. This section provides comparative discussions of the references cited for each parameter. Because there are so few references for the South Pacific and Polar regions, however, they are not discussed in this section. It concerns only references for the North Pacific and Indian Oceans.

3.1. Sea Surface Temperature.

3.1.1. All of the Multiparameter Atlases contain isopleth displays of mean sea surface temperature over entire ocean basins. All have monthly charts except Reference 1.14, which has quarterly charts. The presentations are essentially equivalent; a minor difference is that References 1.10-1.14 show temperatures in °F and the others in °C. There are also minor differences in temperature contour intervals; they range from 1°C to 4°C.

3.1.2. References 1.1 and 1.2, in addition to displays of mean temperatures, also contain isopleth charts of the upper and lower one percentile temperatures and graphs, at numerous locations, of the temperature distribution over each month. These give a good measure of temperature extremes and stability in each area.

3.1.3. Reference 4.1 contains monthly isopleths (0.5°C), and also, for each 5° quadrangle, a graph of the annual cycle of mean temperature. Annual cycles of mean temperature are also given in References 4.2-4.5. References 4.4 and 4.5, however, present cycle graphs for thermally homogeneous areas rather than for arbitrary, and possibly diverse, 5° quadrangles, as the others do.

3.1.4. Information concerning extremes is given in References 4.2 and 4.3, but the data base for these documents is not as comprehensive as for References 1.1 and 1.2, which also give portrayals of extremes.

3.2. Subsurface Sea Temperature.

3.2.1. Although a large base of bathythermograph data exists, no statistical compilations of temperature profiles were found to have been published. (The data has, however, been introduced into compilations of sound velocity profiles.)

3.2.2. For subsurface layer temperatures, the primary references are: 4.1, which gives isopleths of mean monthly temperatures at four subsurface depths in the Pacific, and 1.7, which gives isopleths of mean annual temperatures at 15 depths in the Indian Ocean.

3.3. Mixed Layer Depth. Reference 4.1 gives monthly isopleths, at 50-foot contour intervals, of mean depth to the top of the thermocline for the Pacific. Reference 1.7 gives bimonthly charts in equivalent format (20-meter contour interval) for the Indian Ocean.

3.4. Salinity. Reference 4.1 gives monthly tabulations of mean salinity of the surface and four subsurface layers over the Pacific. Mean salinity of the surface layer in the Indian Ocean is shown in bimonthly charts in Reference 1.7.

3.5. Sound Velocity Profile. References 4.4 and 4.5 contain graphic sound speed profiles for homogeneous areas of the Pacific and Indian Oceans respectively. Reference 4.6 contains a detailed description of the sound speed characteristics of the Indian Ocean. For details of localized, near-shore areas, see References 3.4, 3.5, and 3.6.

3.6. Bathymetry. Reference 4.7 has most recent and comprehensive data concerning ocean-wide bathymetry.

3.7. Acoustic Propagation Loss.

3.7.1. In contrast to most other environmental parameters, which can be characterized by a single numeric value, propagation loss is most meaningful as a function of range. As this requires two graphic dimensions, it is difficult to graphically show its variability. Reference 4.8 attempts to do this by defining four propagation loss curve categories and classifying Pacific areas by the most nearly representative propagation loss class (four seasonal charts). It also identifies areas of good bottom-reflected and convergence zone propagation. Reference 4.9 has quarterly charts of convergence zone reliability, radius range, annulus width, and areas of bottom limiting for the North Pacific.

3.7.2. For localized areas, individual ASRAPs can be requested for a given month. They specify the general propagation loss category of the corresponding area according to category definitions set forth in DIRNAVOCEANMETINST C3160.4 (CH-1), which adopted the definitions originally stated in COMASWFORPACINST C3161.4 of 22 May 1972. The propagation loss categories from a number of ASRAPs can be used to color code, or otherwise annotate, corresponding areas on NWPCB charts (Reference 4.22) for a graphic display. For the Indian Ocean, no climatological studies of propagation loss are available, and ASRAPs are the only alternative.

3.8. Ambient Noise. Reference 4.10 is the most comprehensive broad area treatment of this highly variable parameter for Naval Planning purposes. It presents seasonal charts of

mean levels and estimates of standard deviation for various frequencies.

3.9. Shipping Density. Reference 4.11 presents the only aggregated historical data found to be available.

3.10. Active Acoustic Range. No climatological or statistical studies of this parameter were found to have been made, perhaps because it is so dependent on type, frequency, mode, and power of the active sonar. The primary data source is thus the standard SHARPS forecasts for ships and helicopters, and active ASRAPs for sonobuoys. Estimates of variability might be deduced by comparison of a series of forecasts. Some information concerning local near-shore areas is presented in References 3.4, 3.5, and 3.6.

3.11. Sea/Swell. The most comprehensive treatments of this parameter are given in References 1.1 for the North Pacific, and 1.2 for the Indian Ocean. They depict frequency of various wave heights as a single variable, frequency and height by direction, and the frequency of height-period combinations. They largely supersede the large charts of Reference 4.12. References 1.12 and 1.13 give monthly charts of mean wave heights in the Western Pacific and Indian Oceans. Reference 4.13 contains data concerning how frequently ships have been slowed by high seas during transits.

3.12. Surface Currents.

3.12.1. The primary sources of graphic mean ocean basin current patterns are References 1.1, 1.2, 1.10, and 1.14. These charts are equivalent, and present prevailing directions and speeds for winter and summer in the Pacific and quarterly for the Indian Ocean. They do not, however, give indication of the constancy of speed or direction.

3.12.2. References 4.14-4.16 give a detailed combination of graphic and statistical data from which the variability of currents in small areas (one degree quadrangles) may be ascertained. The scale of these presentations is such as to preclude a clear picture of oceanwide circulation patterns, however, for which the former references are superior.

3.12.3. Description of currents in local, near-shore areas with accompanying charts are given in References 4.17-4.19 for Western Pacific and U.S. West Coast areas.

3.13. Bottom Type. Ocean bottom type, in terms of sediment classification, is given in Reference 4.20. Bottom

type in terms of acoustic reflectivity is given by References 4.21 and 4.22.

3.14. Sea Ice. References 1.1 and 1.14 contain identical monthly presentations of sea ice limits and concentrations. More detailed information is contained in Reference 4.23 for the Northeast Asian Coast and the Bering Sea (which are the primary areas of sea ice in the Pacific). Even more detailed data concerning age, thickness and load capacity is to be found in References 3.4-3.6. (The degree of detail depends on the extent of ice in the area.)

3.15. Surface Air Temperature. Monthly mean air temperature charts are contained in References 1.1, 1.2, 1.10, 1.11, and 1.14. They are essentially equivalent aside from differing contour intervals and use of Fahrenheit or Celsius scales. Reference 1.1 and 1.2 also give charts of frequency of temperature extreme (under 0°C and over 20°C) and cumulative distribution data that provide measures of variability. They also include graphs of mean air temperature by wind direction. Reference 1.14 has monthly graphs of the 5, 25, 50, 75, and 95 percentile temperatures. References 2.1-2.5 give extensive statistical compilations, primarily for land station locations.

3.16. Surface Winds. Various presentations of wind speed and direction data are available. Monthly mean scalar wind speed isopleths are given in References 1.1 and 1.2. Those two references, and 1.14, also contain frequency isopleths of gale force winds and winds under ten knots, as well as roses or graphs indicating wind speed and frequency by direction. References 1.12 and 1.13 show prevailing winds by scattered barb indicators. More detailed statistical data concerning resolved wind components are found in Reference 4.24, which presents isopleths of mean, standard deviation and correlation of zonal and meridional wind components. Extensive statistics for winds at land stations are given in References 2.1-2.5.

3.17. Upper Level Winds. For the North Pacific, Reference 1.14 presents quarterly charts with 500 millibar level wind roses. For the Indian Ocean, Reference 1.6 gives streamlines and wind speed isopleths at several upper levels. Highly statistical presentations are given by References 4.25 and 4.26 for the Northern and Southern Hemispheres.

3.18. Barometric Pressure. The best presentations are contained in References 1.1, 1.2 and 1.14. Each has monthly isopleths (2.5 mb) of mean pressure, graphs of pressure frequency distribution, and data on movement of low pressure centers. Less comprehensive presentations are given in

Reference 1.10 for the Pacific and References 1.12 and 1.13 for the Indian Ocean.

3.19. Cloud Cover. The most comprehensive presentations are given in References 1.1 and 1.2. They have monthly frequency isopleths of cloud cover less than $2/8$ and over $5/8$, frequency distribution graphs of various cloud cover fractions, and graphs of cloud cover fractions by wind direction. References 1.12 and 1.13 give isopleths of mean monthly cloud cover fractions. Reference 4.27 has extensive statistical presentations that give graphic measures of cloudiness variation over time and area.

3.20. Precipitation. Presentations of precipitation frequency and type are given in References 1.1 and 1.2 by frequency isopleths and graphs relating precipitation to wind direction. No compilations were found to be available regarding intensity, amount or duration of precipitation for ocean areas. Such data is, however, tabulated for land stations by References 2.1-2.5.

3.21. Visibility/Ceiling. The most comprehensive presentations are given in References 1.1 and 1.2; they contain frequency isopleths for low visibility, histograms of visibility range distribution, and frequency graphs of various combinations of limited visibility and ceiling. Reference 1.14 contains monthly frequency isopleths of visibility less than one and less than five miles. References 2.1-2.5 give complete tabulations for land stations.

3.22. Storm Activity. References 1.1 and 1.2 again provide the most comprehensive atlas presentations. Two series of monthly charts give frequencies, speeds, directions, mean tracks, limits, and direction constancy of low pressure centers and tropical storms. References 1.10, 1.12, 1.13, and 1.14 depict only mean tracks and limits. Reference 4.29 is a detailed, comprehensive study of storms at sea, and Reference 4.30 deals with typhoon havens in the Western Pacific and Indian Oceans.

PART IV

DETAILED PUBLICATION DESCRIPTIONS

1. GENERAL. This part contains a detailed description of each of the documents listed in Parts II and III. The publication reference numbers correspond to those used in the left-most columns in Part II. The ordering key gives the paragraph of Section V containing appropriate instructions for obtaining the document.

REFERENCE NUMBER 1.1

TITLE: U.S. NAVY MARINE CLIMATIC ATLAS OF THE WORLD,
VOLUME II, NORTH PACIFIC OCEAN

PUBLISHER/ID NO.: DIRNAVOCEANMET/NAVAIR 50-1C-529

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-529

DATE: 1977

ORDERING KEY: V-1

REGION COVERED: NORTH PACIFIC OCEAN (0°-70°N, 100°E-085°W)

DOCUMENT SIZE: 15-1/2" X 10-1/2" x 387 pages (hard-cover)

PARAMETERS/FORMAT:

Presentations are monthly except for surface currents, which are winter-summer. For each parameter, a chart and a set of graphs are presented on opposing pages. There are 45 graphs on each presentation, pertaining to locations identified on corresponding charts.

SURFACE WINDS/Charts: frequency isopleths of winds less than ten knots and greater than 34 knots, and five superposed graphs of gale duration and interval between gales. Graphs: frequency and speed distribution of winds by directions (eight points).

SURFACE AIR TEMP/Charts: isopleths (2°C) of mean air temperature, and frequency isopleths for temperature less than 0°C and greater than 20°C. Graphs: cumulative distribution of temperatures by wind direction (eight points).

TEMPERATURE EXTREMES, WIND SPEED-TEMP/Charts: frequency isopleths of temperature-humidity index greater than 24°C, and isopleths of upper and lower one percentile temperatures. Graphs: frequency tabulations of wind speed-temperature combinations.

SEA SURFACE TEMP/Charts: isopleths (4°C) of mean temperature, and upper and lower one percentile temperatures. Graphs: frequency distribution of temperatures.

REFERENCE NUMBER 1.1

(Continued)

HUMIDITY/Charts: temperature isopleths (4°C) of upper and lower one percentile dew-point temperatures. **Graphs:** frequency distribution of wet-bulb temperatures and relative humidity.

PRECIPITATION/Charts: frequency isopleths of snow, and of all precipitation. **Graphs:** frequency of snow and precipitation by wind direction.

VISIBILITY/Charts: frequency isopleths of visibility greater than five miles and less than two miles. **Graphs:** frequency distribution of visibility ranges and frequency of visibility less than two miles by wind direction.

CLOUD COVER/Charts: frequency isopleths of cloud cover less than $2/8$ and greater than $5/8$. **Graphs:** frequency distribution of cloud cover amount for all clouds and low clouds, plus frequency of cloud cover amounts by wind direction.

CEILING-VISIBILITY/Charts: frequency isopleths of ceiling over 1,000 feet with visibility over five miles, and ceiling less than 600 feet or visibility less than two miles. **Graphs:** frequency tabulations of ceiling-visibility combinations.

WIND-VISIBILITY-CLOUDS/Charts: frequency isopleths of poor carrier flight conditions, which are defined as any one or more of: ceiling under 300 feet; visibility under one mile; wind under six knots; wind of 34 knots or more. **Graphs:** frequency tabulations of wind-visibility-cloud combinations.

SEA LEVEL PRESSURE-MEAN WIND/Charts: isopleths of scalar mean wind speed and mean sea level pressure. They also have scattered mean-wind vectors. **Graphs:** frequency distribution of sea level pressure.

WAVES (LOW-MED)/Charts: frequency isopleths of waves under 1.5 meters and under 2.5 meters. **Graphs:** frequency and height of waves by direction.

WAVES (LARGE)/Charts: frequency isopleths of waves over 3.5 meters and over 6 meters. **Graphs:** frequency tabulations of wave height-period combinations.

REFERENCE NUMBER 1.1

(Continued)

LOW PRESSURE CENTERS/Charts: roses in 5° quadrangles showing frequency and speed of movement by direction. No graphs.

TROPICAL CYCLONES/Charts: primary cyclone tracks, track limits, numerical measures of constancy (of movement) and frequency; roses showing frequency and speed of movement by direction. No graphs.

SURFACE CURRENTS/Charts: (one each for summer and winter) arrows showing mean current direction (set) with numerical speed notation (drift). Four insets provide detail in straits. No graphs.

SEA ICE/Charts: isopleths of mean fractional ice concentrations and lines showing maximum limit of 0.1 concentration. No graphs.

REFERENCE NUMBER 1.2

**TITLE: U.S. NAVY MARINE CLIMATIC ATLAS OF THE WORLD,
VOLUME III, INDIAN OCEAN**

PUBLISHER/ID NO.: DIRNAVOCEANMET/NAVAIR 50-1C-530

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-530

DATE: 1976

ORDERING KEY: V-1

REGION COVERED: 55°S-32°N, 025°E-180°

DOCUMENT SIZE: 15-1/2" x 10-1/2" x 347 pages (hard-cover)

PARAMETERS/FORMAT:

The parameters and format are identical to Reference 1.1 except for the presentation of currents, which is as follows:

CURRENTS/Quarterly charts with arrows showing direction (set) and numerals indicating speed (drift). The presentation months are selected to coincide with the Northeast and Southwest Monsoon seasons and the transition periods between. There are also six small scale insets on each chart showing details of currents in the Persian Gulf and Torres Strait.

REFERENCE NUMBER 1.3

TITLE: U.S. NAVY MARINE CLIMATIC ATLAS OF THE WORLD,
VOLUME V, SOUTH PACIFIC OCEAN

PUBLISHER/ID NO.: CNO/NAVAER 50-1C-532

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAER 50-1C-532

DATE: 1959

ORDERING KEY: V-1

REGION COVERED: SOUTH PACIFIC OCEAN (55°S-30°N, 153°E-058°W)

DOCUMENT SIZE: 19-1/2" x 13" x 275 pages (hard-cover)

PARAMETERS/FORMAT:

All presentations are on chart background, and are monthly unless noted otherwise. Graphs are superposed on charts at 62 selected locations.

SURFACE WIND/Roses showing wind frequency and speed by direction, and tabulations showing speed distribution. Frequency isopleths of winds over ten knots.

GALES/Roses showing gale frequency and speed by direction. Frequency isopleths of winds over 34 knots.

VISIBILITY/Graphs of visibility range distribution, and frequency of visibility under two nautical miles by wind direction.

PRECIPITATION/Roses showing precipitation frequency by wind direction. Isopleths of precipitation frequency.

CLOUD COVER/Graphs of: frequency of cloud cover fractions, and mean cloud cover fractions by wind direction. Frequency isopleths of cloud cover over 2/10 and 6/10.

WIND-VISIBILITY-CLOUD/Frequency tabulations of wind speed-visibility-total cloud combinations.

DEW-POINT/Graphs of cumulative frequency of dew-point temperatures.

REFERENCE NUMBER 1.3

(Continued)

AIR TEMPERATURE/Isopleths (2°F) of mean air temperature.
Graphs of: cumulative frequency of temperature,
distribution of temperatures by wind direction.

**WET-BULB/Graphs of cumulative frequency of wet-bulb
temperatures.**

**TEMPERATURE-WIND SPEED/Frequency tabulations of wind
speed-temperature combinations.**

**BAROMETRIC PRESSURE/Cumulative frequency graphs of
barometric pressure. Isopleths of mean barometric
pressure.**

**AIR-SEA TEMPERATURE DIFFERENCE/Isopleths (2°F) of air-
sea temperature difference.**

**UPPER AIR CHARTS/Quarterly charts showing: frequency of
wind aid, wind retard, by direction; wind roses;
temperature; humidity. There are charts for each of
five upper levels.**

REFERENCE NUMBER 1.4

TITLE: U.S. NAVY MARINE CLIMATIC ATLAS OF THE WORLD,
VOLUME VI, ARCTIC OCEAN

PUBLISHER/ID NO.: CNO/NAVWEPS 50-1C-533

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVWEPS 50-1C-533

DATE: 1963

ORDERING KEY: V-1

REGION COVERED: ARCTIC OCEAN (70°-90°N)

DOCUMENT SIZE: 20" x 13-1/2" x 300 pages (hard-cover)

PARAMETERS/FORMAT:

All presentations are on chart background, with superposed graphs or roses. All are monthly unless noted otherwise.

AIR TEMPERATURE/Graphs of air temperature by wind speed and by wind direction.

SURFACE WIND/Roses and graphs showing surface wind speed and frequency by direction.

PRECIPITATION/Annual graph showing frequency of precipitation by wind direction.

CLOUD COVER/Graphs showing frequency of cloud cover fractions.

VISIBILITY/Graphs of visibility range distribution.
Graphs of frequency of visibility under 2 nautical miles by wind direction.

WIND-VISIBILITY-CLOUD/Frequency tabulations of wind speed-visibility-cloud cover combinations.

STORM TRACKS/Arrows indicating primary tracks and limits.

DURATION OF EVENTS/Graphs showing frequency distributions of duration of: gales, low temperatures, low visibility.

UPPER LEVEL WINDS/Monthly charts showing mean winds at upper levels (950 to 300 mb, 300 to 20 mb) and probability of aid-retard at upper levels.

REFERENCE NUMBER 1.5

**TITLE: U.S. NAVY MARINE CLIMATIC ATLAS OF THE WORLD,
VOLUME VII, ANTARCTIC**

PUBLISHER/ID NO.: CNO/NAVWEPS 50-1C-50

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVWEPS 50-1C-50

DATE: 1965

ORDERING KEY: V-1

REGION COVERED: ANTARCTIC (40°S-90°S LAT)

DOCUMENT SIZE: 20" x 13-1/2" x 300 pages (hard-cover)

PARAMETERS/FORMAT:

The parameters and format of this atlas are essentially identical to those of Reference 1.4.

REFERENCE NUMBER 1.6

TITLE: METEOROLOGICAL ATLAS OF THE INTERNATIONAL INDIAN
OCEAN EXPEDITION (VOLUMES I AND II)

PUBLISHER: NATIONAL SCIENCE FOUNDATION

DISTRIBUTOR: U.S. GOVERNMENT PRINTING OFFICE

STOCK NUMBERS: VOLUME I (SURFACE): 3800-00123
VOLUME II (UPPER AIR): 3800-00124

DATE: 1972

ORDERING KEY: V-3

REGION COVERED: 45°S-30°N, 020°E-155°E

DOCUMENT SIZE: 17" x 14-1/2" x 150 pages (hard-cover)

PARAMETERS/FORMAT:

The expedition gathered data during a 24-month period;
for each parameter there are 24 corresponding monthly charts.

VOLUME I

WIND AND SEA LEVEL PRESSURE/Charts with: arrows showing prevailing wind directions; isopleths of mean sea level pressure; in five-degree quadrangles, resultant wind speed, direction, and steadiness.

AIR AND SEA SURFACE TEMPERATURE/Charts with: isopleths (2°C) of mean sea surface temperature; isopleths (1°C) of mean air-sea temperature difference; in five-degree quadrangles, numerical mean sea and air temperature.

VAPOR PRESSURE/Charts with: isopleths (4 mb) of mean vapor pressure; isopleths (4 mb) of saturation vapor pressure; in five-degree quadrangles, mean vapor pressure and saturation pressure.

CLOUDS AND PRECIPITATION/Charts with: isopleths of mean cloud cover fractions; in five-degree quadrangles, mean cloud fraction, frequency of precipitation, frequency of thunderstorms.

HEAT EXCHANGE AT SEA SURFACE/Charts with: radiation gain and equivalent heat loss; in five-degree quadrangles, mean net radiation gain, evaporative heat loss, sensible heat loss.

REFERENCE NUMBER 1.6

(Continued)

VOLUME II (UPPER AIR)

WIND/Monthly charts with streamlines and isopleths of mean scalar speed at 850, 700, 500, 300, 200, and 100 mb levels. Monthly sets of four meridional cross sections of zonal winds (knots) and potential temperature.

COMMENTS:

The great bulk of the information in this atlas has been incorporated into Reference 1.2, the Standard Navy Marine Atlas, which is more readily obtained. The other presentations are directed more to scientific than Naval users and the Atlas is included here mainly because Volume II contains upper air data not presented in the Navy Atlas.

REFERENCE NUMBER 1.7

TITLE: OCEANOGRAPHIC ATLAS OF THE INTERNATIONAL INDIAN OCEAN EXPEDITION

PUBLISHER: NATIONAL SCIENCE FOUNDATION

DISTRIBUTOR/ID NO.: U.S. GOVERNMENT PRINTING OFFICE/
STOCK NO. 3800-0104

DATE: 1971

ORDERING KEY: V-3

REGION COVERED: ENTIRE INDIAN OCEAN (71°S-30°N, 020°E-150°E)

DOCUMENT SIZE: 16" x 12-1/2" x 531 pages (hard-cover)

PARAMETERS/FORMAT:

The presentations contain only data gathered by the expedition in 1963.

SEA SURFACE TEMPERATURE/Monthly charts showing isopleths (1°C) of mean surface temperature.

SURFACE SALINITY/Bimonthly charts with isopleths of the mean surface salinity.

SUBSURFACE TEMPERATURE/Charts showing isopleths (1°C) of mean annual temperature at 15 depths to 5,000 meters. In 600-mile squares, temperature profiles to 3,000 meters.

LAYER DEPTH/Bimonthly charts with isopleths (20 m) of mixed layer depth.

OTHER PARAMETERS/Numerous other parameters, primarily chemical and geologic, are presented in varying format.

COMMENTS:

This atlas is directed primarily to scientific users and, despite its substantial merit for that purpose, most of its contents have little direct consequence for planning naval operations. It is included here as the only source of data on Indian Ocean layer depth, salinity, and subsurface temperature.

REFERENCE NUMBER 1.8

TITLE: OCEANOGRAPHIC ATLAS OF THE POLAR SEAS, PART I,
ANTARCTIC

PUBLISHER/ID NO.: NAVOCEANO/H.O. Pub. No. 705, Part I

DISTRIBUTOR/ID NO.: DMAHC/NOPUB705P1

DATE: 1957

ORDERING KEY: V-2

REGION COVERED: 50°S-90°S

DOCUMENT SIZE: 16" x 12-1/2" x 70 pages (soft-cover)

PARAMETERS/FORMAT:

Contains 78 charts, mostly quarterly, depicting the following parameters:

TIDES
CURRENTS
SEA SURFACE TEMPERATURE
ICE (Means, limits, extremes)
SEA/SWELL
GEOLOGY
BIOLOGY

REFERENCE NUMBER 1.9

TITLE: OCEANOGRAPHIC ATLAS OF THE POLAR SEAS, PART II,
ARCTIC

PUBLISHER/ID NO.: NAVOCEANO/H.O. Pub. No. 705, Part II

DISTRIBUTOR/ID NO.: DMAHC/NOPUB705P2

DATE: 1958

ORDERING KEY: V-2

REGION COVERED: 70°N-90°N

DOCUMENT SIZE: 16" x 12-1/2" x 70 pages (soft-cover)

PARAMETERS/FORMAT:

Contains charts, mostly quarterly, depicting the following parameters:

TIDES
CURRENTS
SEA SURFACE TEMPERATURE
ICE (Means, limits, extremes)
SEA/SWELL
GEOLOGY
BIOLOGY

REFERENCE NUMBER 1.10

TITLE: PILOT CHART OF THE NORTH PACIFIC OCEAN

PUBLISHER/ID NO.: NAVOCEANO/N.O. 55

DISTRIBUTOR/ID NO.: DMAHC/PILOT 55 (MONTH, YEAR)

DATE: ISSUED MONTHLY FOR SPECIFIC MONTH AND YEAR

ORDERING KEY: V-2

REGION COVERED: 0°-73°N, 155°E-075°W

DOCUMENT SIZE: Single charts, 42" x 28"

PARAMETERS/FORMAT:

(FULL SCALE CHART WITH TWO SMALL SCALE INSETS)

FULL SCALE: (Approximately 1:15,000,000)

WIND/Roses with frequency and mean speed by direction

CURRENTS/Direction arrows, mean speed numerics

ICE LIMITS/Mean, min, max limits of 1/8 concentration

SMALL SCALE: (Approximately 1:65,000,000)

BAROMETRIC PRESSURE/Isobars (2.5 mb) of mean barometric pressure

STORM TRACKS/Mean tracks shown by arrows

GALE PROBABILITY/Numeric frequency in 5° quadrangles

AIR TEMPERATURE/Isopleths (2°C) of mean air temperature

LOW VISIBILITY/Frequency isopleths of visibility under two miles

SEA TEMPERATURE/Isopleths (4°C) of mean sea surface temperature

REFERENCE NUMBER 1.11

TITLE: ATLAS OF PILOT CHARTS, SOUTH PACIFIC AND INDIAN OCEANS

PUBLISHER/ID NO.: NAVOCEANO/N.O. 107

DISTRIBUTOR/ID NO.: DMAHC/NVPUB107

DATE: 1966

ORDERING KEY: V-2

REGION COVERED: South Pacific and Indian Oceans

DOCUMENT SIZE 42" x 28"

PARAMETERS/FORMAT:

This document is comprised of series of charts each similar in format to Reference 1.10, except for the area covered.

REFERENCE NUMBER 1.12

TITLE: CLIMATIC SUMMARIES FOR MAJOR SEVENTH FLEET PORTS AND WATERS

PUBLISHER/ID NO.: COMNAVWEASERV/NAVAIR 50-1C-62

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-62

DATE: 1973

ORDERING KEY: V-1

REGION COVERED: NORTHWEST PACIFIC AND EASTERN INDIAN OCEANS
(10°S-45°N, 065°E-155°E)

DOCUMENT SIZE: 15" x 10" x 110 pages (soft-cover)

DOCUMENT FORMAT:

This document contains both tabular and graphic material. It is thus indexed twice, once here with the Atlases and again as Reference 2.2 with the Numerical Tabulations. The graphic contents are described here, the tabular with the other entry.

PARAMETERS/FORMAT:

Monthly charts are given for the following parameters:

SEA SURFACE TEMPERATURE/Isopleths (2°F) of mean temperature.

AIR TEMPERATURE/Isopleths (5°F) of mean air temperature.

PRESSURE/Isopleths (2 mb) of mean barometric pressure.

STORMS/Primary tracks shown with arrows, limits. In 5° quadrangles, numerical storm frequency and direction constancy. Isopleths of mean storm speed.

WIND/Wind barbs in 5° quadrangles giving mean speed and prevailing direction. Frequency isopleths of gale force winds.

CLOUDS/Shaded contours of mean cloud cover fractions. Isopleths of mean relative humidity.

WAVE HEIGHT/ Isopleths (2 ft.) of mean combined sea-swell height.

REFERENCE NUMBER 1.13

TITLE: CLIMATIC SUMMARIES FOR MAJOR INDIAN OCEAN PORTS AND WATERS

PUBLISHER/ID NO.: COMNAVWEASERV/NAVAIR 50-1C-63

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-63

DATE: 1974

ORDERING KEY: V-1

**REGION COVERED: WESTERN INDIAN OCEAN
(32°S-32°N, 030°E-080°E)**

DOCUMENT SIZE: 8" x 10-1/2" x 125 pages (soft-cover)

PARAMETERS/FORMAT:

The format of this document is identical to that of Reference 1.12, except for the area covered. The tabular material from this document is described under Reference 2.3.

REFERENCE NUMBER 1.14

TITLE: SAILING DIRECTIONS (PLANNING GUIDE) FOR THE NORTH
PACIFIC OCEAN (APPENDIX A)

PUBLISHER/ID NO.: DMAHC/Pub. No. 152

DISTRIBUTOR /ID NO.: DMAHC/SDPUB152

DATE: 1972

ORDERING KEY: V-2

REGION COVERED: NORTH PACIFIC (0°N-70°N, 100°E-085°W)

DOCUMENT SIZE: 8" x 10-1/2" loose-leaf, 2" thick

DOCUMENT FORMAT:

This document contains both extensive narrative material and a graphic appendix. The appendix is described here; the narrative part of the document is described under Reference 3.1.

PARAMETERS/FORMAT:

The appendix charts are adaptations of earlier Navy atlas charts. They are approximately the same size as in that atlas, but are folded for compact storage of this document. All charts are monthly unless otherwise noted.

SURFACE WIND/Frequency isopleths of winds over 34 knots; wind roses showing frequency and speed distribution by direction.

STORMS/Primary and secondary tracks shown by arrows. Roses showing frequency and mean movement speed by direction.

VISIBILITY/Frequency isopleths of visibility under 1 nautical mile and under 5 nautical miles.

CLOUDS/Frequency isopleths of total cloud cover under 2/10 and over 8/10.

AIR TEMPERATURE/For 48 station locations, graphs showing 95, 75, 50, 25, 5 percentile temperatures; isopleths (4°C) of mean air temperature.

REFERENCE NUMBER 1.14

(Continued)

PRESSURE/Isopleths (2.5 mb) of mean barometric pressure; graphs showing 95, 75, 50, 25, 5 percentile pressures at 48 station locations. Roses showing low pressure center movement frequency and speed by direction.

UPPER LEVEL WINDS/Quarterly charts with roses showing 500 mb level wind frequency and speed distribution by direction.

SEA SWELL/Frequency isopleths of seas over 5, 8, and 12 feet.

SEA SURFACE TEMPERATURE/Isopleths (2°F) of mean sea surface temperature. (Quarterly charts.)

ICE/Shaded areas indicating mean concentrations and lines indicating maximum limits of 0.1 concentration.

CURRENTS/Semiannual (winter, summer) charts showing prevailing current directions (set) by arrows and mean speeds (drift) by appended numerals.

REFERENCE NUMBER 2.1

TITLE: SUMMARY OF SYNOPTIC METEOROLOGICAL OBSERVATIONS

PUBLISHER: U.S. NAVAL WEATHER SERVICE COMMAND

DISTRIBUTOR: DEFENSE DOCUMENTATION CENTER

DATE: VARIOUS FOR VARIOUS VOLUMES

ORDERING KEY: V-5 (See Series Format below)

REGION COVERED: WORLDWIDE, AT STATION LOCATIONS

DOCUMENT SIZE: 8" x 11" x 400 pages (each volume)

PARAMETERS/FORMAT:

Series Format. The document series is now comprised of 89 volumes, each volume covering several adjacent coastal marine areas. In aggregate, the series covers over 450 local areas of varying size. A description of the areas covered and document accession numbers is contained in:

Climatic Publications Prepared for the Director, Naval Oceanography and Meteorology (November, 1977)

Available from:

Naval Weather Service Detachment
Asheville, North Carolina 28801

Document Format. For each of the areas covered, there is a set of 21 tables for each month. The tables deal primarily with meteorological parameters; most of them give percentage frequency of occurrence of various combinations of the following: wind speed, wind direction, amount of precipitation, cloud cover fraction, visibility range, humidity, temperature, wave height, time of day.

REFERENCE NUMBER 2.2

TITLE: CLIMATIC SUMMARIES FOR MAJOR SEVENTH FLEET PORTS AND WATERS

PUBLISHER/ID NO.: COMNAVWEASERV/NAVAIR 50-1C-62

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-62

DATE: 1973

ORDERING KEY: V-1

REGION COVERED: NORTHWEST PACIFIC AND EASTERN INDIAN OCEANS
(10°S-45°N, 065°E-155°W)

DOCUMENT SIZE: 15" x 10" x 110 pages (soft-cover)

DOCUMENT FORMAT:

This document contains both graphic and tabular material. The graphic portion is described as Reference 1.12, the tabular portion is described here.

PARAMETERS/FORMAT:

Tabulations of the following data are presented by month for each of 61 selected land locations.

PRECIPITATION/Mean days per month with, mean monthly total amount.

THUNDERSTORM/Mean days per month with at least one.

FOG/Mean days per month with.

SNOW/Mean monthly amount.

RELATIVE HUMIDITY/Mean observed percent.

AIR TEMPERATURE/Monthly mean, min, max; mean daily max, mean daily min.

WIND/Prevailing direction, mean speed.

REFERENCE NUMBER 2.3

TITLE: CLIMATIC SUMMARIES FOR MAJOR INDIAN OCEAN PORTS AND WATERS

PUBLISHER/ID NO.: COMNAVWEASERV/NAVAIR 50-1C-63

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-63

DATE: 1974

ORDERING KEY: V-1

**REGION COVERED: WESTERN INDIAN OCEAN
(32°S-32°N, 030°E-080°E)**

DOCUMENT SIZE: 8" x 10-1/2" x 125 pages (soft-cover)

PARAMETERS/FORMAT:

The format of the tabular material in this document is identical to Reference 2.2, except that there are tabulations for 44 locations rather than 61. The graphic material from this document is described as Reference 1.13.

REFERENCE NUMBER 2.4

TITLE: CLIMATOLOGICAL SURVEY OF THE PACIFIC

PUBLISHER/ID NO.: FLEWEACEN, PEARL/14ND-FWC-P-3140/6

DISTRIBUTOR/ID NO.: FLEWEACEN, PEARL/14ND-FWC-P-3140/6

DATE: 1969

ORDERING KEY: V-4

REGION COVERED: SEVERAL HUNDRED COASTAL AND ISLAND STATIONS
ABOUT THE NORTH PACIFIC OCEAN

DOCUMENT SIZE: 8" x 10-1/2" x 70 pages (soft-cover)

PARAMETERS/FORMAT:

All presentations are tabular by month and station.

AIR TEMP/Extreme max, mean daily max, mean daily min,
extreme min.

HUMIDITY/Mean relative humidity.

WIND/Mean direction, mean speed.

CLOUD COVER/Mean percent of cover (monthly).

PRECIPITATION/Mean monthly total, 24-hour max.

VISIBILITY/Frequency of visibility under two nautical
miles.

CEILING/Frequency of low ceiling.

WEATHER/Mean days per month with clear skies; cloudy
skies; thunderstorms; fog; snow; gales; precipitation.

REFERENCE NUMBER 2.5

TITLE: U.S. NAVY WORLD-WIDE AIRFIELD SUMMARIES

PUBLISHER/ID NO.: COMNAVWEASERV/(NO NUMBER)

DISTRIBUTOR: DEFENSE DOCUMENTATION CENTER

DATE: VARIOUS AMONG VOLUMES

ORDERING KEY: V-5 (See Comments below)

REGION COVERED: WORLD-WIDE

DOCUMENT SIZE: Each volume is 8" x 11" (soft-cover)

SERIES FORMAT:

The summaries are comprised of 12 volumes, some having multiple parts. The total number of regional parts is now 27. In aggregate they cover about 3,000 airfields.

PARAMETERS/FORMAT:

All presentations are tabular by month and field.

AIR TEMP/Monthly max, min; mean daily max, mean daily min;
frequency of temperature over 90°F, under 32°F,
under 0°F.

RELATIVE HUMIDITY/Mean percent relative humidity.

BAROMETRIC PRESSURE/Mean barometric pressure.

PRECIPITATION/Amounts by type, days with.

CEILING, VISIBILITY/Frequency of poor flight conditions.

WIND/Frequency of wind over 16 and 28 knots.

COMMENTS:

Those desiring to obtain documents from this series should contact their nearest Naval Weather Service activity to obtain the DDC Accession Numbers of the volumes of interest.

REFERENCE NUMBER 3.1

**TITLE: SAILING DIRECTIONS (PLANNING GUIDE) FOR THE NORTH
PACIFIC OCEAN**

PUBLISHER/ID NO.: DMAHC/Pub. No. 152

DISTRIBUTOR/ID NO.: DMAHC/SDPUB152

DATE: 1972

ORDERING KEY: V-2

REGION COVERED: NORTH PACIFIC OCEAN (0°-70°N 100°E-085°W)

DOCUMENT SIZE: 8" x 10-1/2" loose-leaf, 2" thick

DOCUMENT FORMAT:

This document contains both narrative material and an appendix of atlas-type charts. The appendix is indexed as Reference 1.14 and that entry describes the charts. The narrative material is described below.

PARAMETERS/FORMAT:

Approximately half of the 300 text pages concern environmental factors throughout the Pacific. A variety of parameters, and their interrelationships, are discussed for the Pacific as a whole, then again for each of four quadrants of the basin. Parameters addressed include currents, tides, sea and swell, and temperatures. Weather patterns are discussed by season for the whole Pacific and more specifically again for each of the four quadrants.

REFERENCE NUMBER 3.2

TITLE: NATIONAL INTELLIGENCE SURVEY, PACIFIC BASIN - MARINE
CLIMATE AND OCEANOGRAPHY (U) (SECRET)

PUBLISHER/ID NO.: CENTRAL INTELLIGENCE AGENCY/NIS 105

DISTRIBUTOR/ID NO.: See Comments below

DATE: VARIOUS AMONG VOLUMES--BEGAN IN EARLY 1950's

ORDERING KEY: See Comments below

REGION COVERED: PACIFIC OCEAN (60°S-70°N, 100°E-060°W)

DOCUMENT SIZE: Each volume is 9" x 12". In aggregate, the
volumes occupy over 5 feet of shelf space.

SERIES FORMAT:

The document is comprised of 12 volumes, each bound in two parts. Each of the 12 volumes pertains to a geographic segment of the Pacific; the two parts address Marine Climate and Oceanography.

PARAMETERS/FORMAT:

Each volume contains extensive discussion of the climatic controls that dominate the area, the relationships among climatic parameters, and the behavior of individual parameters. The text is supplemented by appropriate charts, tables and figures. The topics addressed and the mode of presentation varies among the volumes, depending on the dominant features of the area.

An important aspect of these documents is their thorough treatment of near-shore areas, beaches, and coastal land areas. References 3.4 and 3.5 also address near-shore ocean areas, but do not address the shoreline and coastal land areas.

COMMENTS:

These documents are no longer being printed or distributed. They are held by Fleet Weather Centrals and Naval Weather Service Facilities, as well as by Fleet and other major commands, where they may be used temporarily. They are listed here because they are by far the most extensive and detailed collection of climatological data for the Pacific and Indian Oceans.

REFERENCE NUMBER 3.3

TITLE: NATIONAL INTELLIGENCE SURVEY, INDIAN OCEAN - MARINE CLIMATE AND OCEANOGRAPHY

PUBLISHER/ID NO.: CENTRAL INTELLIGENCE AGENCY/NIS 106

DISTRIBUTOR/ID NO.: See Comments for Reference 3.2

DATE: VARIOUS AMONG VOLUMES, SINCE 1960

ORDERING KEY: See Comments for Reference 3.2

REGION COVERED: INDIAN OCEAN (60°S-20°N, 020°E-130°E)

DOCUMENT SIZE: All volumes are 9" x 12"

PARAMETERS/FORMAT:

This series is similar to Reference 3.2 for the Pacific, except that the Indian Ocean is treated in 4 volumes rather than 12.

REFERENCE NUMBER 3.4

TITLE: MINE WARFARE PILOT - (AREA NAME) (U) (SECRET)

PUBLISHER: NAVOCEANO

DISTRIBUTOR: DMAHC

DATE: VARIOUS AMONG VOLUMES

ORDERING KEY: V-2

REGION COVERED: STRATEGIC COASTAL AREAS

DOCUMENT SIZE: 8" x 12" x approximately 60 pages per volume

PARAMETERS/FORMAT:

This document consists of a series of classified studies of strategic coastal areas. The areas covered, the topics addressed, and instructions for obtaining the documents are described in NAVOCEANO Catalog of Classified Publications (U) SECRET. The catalog number is SPPUB3P(S), and it may be obtained from DMAHC by using Ordering Key V-2.

REFERENCE NUMBER 3.5

TITLE: ENVIRONMENTAL PLANNING STUDY OF (AREA NAME) (U)
(SECRET, CONFIDENTIAL)

PUBLISHER: NAVOCEANO

DISTRIBUTOR: DMAHC

DATE: VARIOUS AMONG SERIES

ORDERING KEY: V-2

REGION COVERED: STRATEGIC STRAITS AND COASTAL AREAS

DOCUMENT SIZE: 8" x 12-1/2" x 80 pages per volume

PARAMETERS/FORMAT:

This document consists of a series of classified studies of strategic straits and coastal areas. The areas covered, the topics addressed, and instructions for ordering them are described in NAVOCEANO Catalog of Classified Publications (U) SECRET. The catalog number is SPPUB3P(S), and it may be obtained from DMAHC by using Ordering Key V-2.

REFERENCE NUMBER 3.6

**TITLE: OPERATIONAL OCEANOGRAPHY OF THE (AREA) FOR
SUBMARINERS (U) (CONFIDENTIAL)**

**PUBLISHER/ID NO.: NAVOCEANO/SP-65 (NORTHWEST PACIFIC OCEAN)
NAVOCEANO/SP-77 (WESTERN PACIFIC OCEAN)
NAVOCEANO/SP-89 (SOUTH CHINA SEA)
NAVOCEANO/SP-119 (BERING & CHUKCHI SEAS)**

**DISTRIBUTOR/ID NO.: DMAHC/SPPUB65
DMAHC/SPPUB77
DMAHC/SPPUB89
DMAHC/SPPUB119**

DATE: 1963, 1966, 1968, 1970

ORDERING KEY: V-2

**REGION COVERED: SP65 - (29°-57°N, 144°E-175°E)
SP77 - (0°-45°N, 125°E-160°E)
SP89 - (15°S-30°N, 090°E-125°E)
SP119 - (50°-90°N, 160°E-120°W)**

DOCUMENT SIZE: 17" x 17"

PARAMETERS/FORMAT:

These documents contain extensive detailed descriptions and graphic material pertaining to the respective areas. The contents are not described in detail here due to security classification.

REFERENCE NUMBER 4.1

TITLE: ATLAS OF NORTH PACIFIC OCEAN MONTHLY MEAN TEMPERATURES
AND MEAN SALINITIES OF THE SURFACE AND SUBSURFACE
LAYERS

PUBLISHER/ID NO.: NAVOCEANO/REFERENCE PUB 2

DISTRIBUTOR/ID NO.: DMAHC/NOPUBRP2

DATE: 1976

ORDERING KEY: V-2

REGION COVERED: 05°S-73°N, 113°E-075°W

DOCUMENT SIZE: 15" x 22" x 200 pages

PARAMETERS/FORMAT:

All presentations are monthly on chart background.

SEA TEMPERATURE/Isopleths (.5°C) intervals of mean
temperature of surface and 100-, 200-, 300-, and
400-foot layers.

DEPTH TO THERMOCLINE/Isopleths (50 ft.) of depth to the
top of the thermocline.

SALINITY/Tabulations of mean salinity of surface and 100-,
200-, 300-, and 400-foot layers in 5° quadrangles.

TEMPERATURE DIFFERENCE/Isopleths of temperature difference
between surface and 400-foot depth.

ANNUAL TEMPERATURE CYCLE/For each 5° quadrangle, graphs
of the monthly means over the year, at each of five
depths.

REFERENCE NUMBER 4.2

TITLE: MONTHLY CHARTS OF MEAN, MINIMUM, AND MAXIMUM SEA
SURFACE TEMPERATURE OF THE NORTH PACIFIC OCEAN

PUBLISHER/ID NO.: NAVOCEANO/SP-123

DISTRIBUTOR/ID NO.: DMAHC/SPPUB123

DATE: 1969

ORDERING KEY: V-2

REGION COVERED: 20°S-65°N, 120°E-070°W

DOCUMENT SIZE: 12-1/2" x 16" x 67 pages (soft-cover)

PARAMETERS/FORMAT:

SEA SURFACE TEMPERATURE/Monthly charts with isopleths
(2°F) of mean, min, max temperatures. At 54 selected
locations, graphs showing: mean, max, min; upper
and lower 2.5 percentile; upper and lower 25 percen-
tile temperatures.

REFERENCE NUMBER 4.3

TITLE: MONTHLY CHARTS OF MEAN, MINIMUM, AND MAXIMUM SEA
SURFACE TEMPERATURE IN THE INDIAN OCEAN

PUBLISHER/ID NO.: NAVOCEANO/SP-99

DISTRIBUTOR/ID NO.: DMAHC/SPPUB99

DATE: 1967

ORDERING KEY: V-2

REGION COVERED: 50°S-30°N, 020°E-150°E

DOCUMENT SIZE: 12-1/2" x 16" x 50 pages

PARAMETERS/FORMAT:

SEA SURFACE TEMPERATURE/Monthly charts with isopleths
(2°F) of mean, min, max temperatures. At 54 selected
locations, graphs showing: mean, max, min; upper
and lower 2.5 percentile; upper and lower 25 per-
centile temperatures.

REFERENCE NUMBER 4.4

TITLE: SOUND SPEED PROFILES OF THE NORTH PACIFIC OCEAN

PUBLISHER/ID NO.: NAVAL UNDERWATER SYSTEMS CENTER/
Technical Document 5271

DISTRIBUTOR/ID NO.: NUSC/TD5271

DATE: 1976

ORDERING KEY: V-6

REGION COVERED: 10°S-63°N, 120°E-095°W

DOCUMENT SIZE: 8-1/2" x 11" loose-leaf 1-1/2" thick

PARAMETERS/FORMAT:

Two sets of graphic sound speed profiles are presented. The first set is for the depths below 1,200 feet. These deep profiles are relatively constant in time, and are used by matching them with shallow profiles computed on-site from BT observations. The second set is provided for when shallow observations cannot be made. They are monthly mean profiles for the upper 4,500 feet, which can be matched to appropriate deep profiles. Either procedure results in a sound speed profile from surface to bottom.

The deep profiles do not vary seasonally, and one profile is presented for each of 120 separate homogeneous areas. The areas are depicted on a master chart. The shallow profiles do vary over the year and a set is presented for each month. Each shallow profile can be matched to a corresponding deep profile, giving a complete profile for any area and month. The areas of homogeneous conditions do not correspond to those used on NWPCB charts (Reference 4.22).

The shallow profiles have a speed resolution of one foot per second and a depth resolution of 50 feet. The deep profiles have a speed resolution of two feet per second and depth resolution of 50 feet.

The document also contains tabular presentations of sound speed at selected depths for each of the 120 homogeneous areas to a depth of 21,000 feet. It also has graphic presentations of the annual mean surface temperature cycles for each of 55 homogeneous areas.

REFERENCE NUMBER 4.5

TITLE: SOUND SPEED PROFILES FOR THE INDIAN OCEAN

**PUBLISHER/ID NO.: NAVAL UNDERWATER SYSTEMS CENTER/
Technical Document 5555**

DISTRIBUTOR/ID NO.: NUSC/TD5555

DATE: 1976

ORDERING KEY: V-6

REGION COVERED: 50°S-40°N, 020°E-130°E

DOCUMENT SIZE: 8-1/2" x 11" loose-leaf 1-1/2" thick

PARAMETERS/FORMAT:

The format of this document is identical to that of Reference 4.4 just described, except that the number of homogeneous areas is 71 rather than 120.

REFERENCE NUMBER 4.6

TITLE: THE SOUND VELOCITY STRUCTURE OF THE NORTH INDIAN OCEAN

PUBLISHER/ID NO.: NAVOCEANO/TR-231

DISTRIBUTOR/ID NO.: DMAHC/TRPUB231

DATE: 1972

ORDERING KEY: V-2

REGION COVERED: 10°S-30°N, 040°E-120°E

DOCUMENT SIZE: 8" x 10-1/2" x 80 pages (soft-cover)

PARAMETERS/FORMAT:

The document is primarily a narrative description of acoustic conditions. It contains some pertinent graphics.

The topics treated cover:

- General Oceanography - description of water masses
- Sound Velocity Perturbations
- Deep Sound Channel Characteristics
- Critical Depth Changes by Season

REFERENCE NUMBER 4.7

TITLE: BATHYMETRIC ATLAS OF THE NORTH PACIFIC OCEAN

PUBLISHER/ID NO.: NAVOCEANO/H.O. Pub. 1301-3

DISTRIBUTOR/ID NO.: DMAHC/NOPUB1301-3

DATE: 1971

ORDERING KEY: V-2

REGION COVERED: 04°S-60°N, 100°E-080°W

DOCUMENT SIZE: 16" x 21" x 160 pages

PARAMETERS/FORMAT:

The document consists of a series of charts, each encompassing 10° of longitude and 4° to 7° of latitude. The scale is variable because of the Mercator Projection of the charts, but is approximately 1:2,400,000.

The bathymetry is shown by contour lines at 200 fathom intervals in deep areas, and finer intervals in shallow ones. Sea mounts and other features are named.

The document was published originally in three separate volumes by area, but now is available only as a single volume containing all 160 charts.

REFERENCE NUMBER 4.8

TITLE: SEASONAL LOW FREQUENCY PROPAGATION LOSS CLASSIFICATION
CHARTS OF THE NORTH PACIFIC AND NORTH ATLANTIC
OCEANS (U) (CONFIDENTIAL)

PUBLISHER/ID NO.: NAVOCEANO/TN 3440-C3-75

DISTRIBUTOR/ID NO.: DMAHC/TN3440C375

DATE: 1975

ORDERING KEY: V-2

REGION COVERED: 30°N-65°N, 120°E-115°W

DOCUMENT SIZE: 14" x 11" x 35 pages

PARAMETERS/FORMAT:

Four "typical" propagation loss curve categories are established, based on relations among direct path, bottom-reflected, and CZ propagation conditions. The categories are the same as those used on ASRAP forecasts, and defined in DIRNAVOCEANMETINST 3161.4 (Ch. 1). Propagation loss curves for homogeneous ocean areas are then generated, and classed as belonging to one of the four categories. Seasonal charts show, for each area, the appropriate propagation loss category. The area divisions do not correspond to those used on the ASW Prediction Area NWPCB charts (Reference 4.22).

REFERENCE NUMBER 4.9

TITLE: SONIC CONVERGENCE ZONE ATLAS FOR THE NORTH PACIFIC
OCEAN (U) (CONFIDENTIAL)

PUBLISHER/ID NO.: U.S. NAVY HYDROGRAPHIC OFFICE/
H.O. Pub. No. 253

DISTRIBUTOR/ID NO.: DMAHC/HOP253

DATE: 1961

ORDERING KEY: V-2

REGION COVERED: 0°-60°N, 105°E-080°W

DOCUMENT SIZE: 12-1/2" x 16" x 20 pages

PARAMETERS/FORMAT:

Four charts are presented for each of four seasons.
They depict:

CZ RELIABILITY/Charts with shading to indicate areas of
reliable, marginal, and no CZ.

CZ RANGE/Charts with isopleths of CZ range in areas of
possible CZ.

CZ SURFACE INSONIFICATION INTERVAL/Charts with isopleths
of CZ annulus width.

CZ MODE/Charts with shading to indicate areas of possible
bottom limiting or positive gradient.

COMMENTS:

The publication is obsolete in the sense that better
predictions for specific times and places are available on
request from the FLEWEACEN's. It is included here because
it gives a presentation of the degree of reliability of CZ
propagation and need not be ordered separately for each
instance of use. Also, the charts give a broad area perspec-
tive not shown by local area predictions.

REFERENCE NUMBER 4.10

TITLE: ESTIMATES OF AMBIENT NOISE IN THE DEEP OCEAN (U)
(CONFIDENTIAL)

PUBLISHER/ID NO.: GENERAL OCEANOLOGY, INC./Report No. 4

DISTRIBUTOR/ID NO.: DDC/AD 513205

DATE: 1968

ORDERING KEY: V-5

REGION COVERED: WORLDWIDE BETWEEN 60°S-82°N

DOCUMENT SIZE: 8-1/2" x 11", 65 pages

PARAMETERS/FORMAT:

The report contains narrative and graphic material. The text presents a discussion of the physics of deep ocean noise and distinguishes the generating mechanisms of high and low frequency noise (wind and ships). For low frequency noise, a contour plot associates ocean areas with corresponding ship-generated noise curves. For wind-generated high frequency noise, seasonal charts give numerical estimates of noise levels at selected locations for frequencies of 500, 1,000, 2,000, and 5,000 Hz.

REFERENCE NUMBER 4.11

TITLE: OCEAN ROUTE ENVELOPES

PUBLISHER: PLANNING SYSTEMS, INCORPORATED

DISTRIBUTOR: NORDA/PSI Report No. 1036

DATE: 1977

ORDERING KEY: V-9

REGION COVERED: WORLD'S OCEANS

DOCUMENT SIZE: 8-1/2" x 11" x 300 pages

PARAMETERS/FORMAT:

This document contains primarily narrative material dealing with the mathematical process of quantifying ship routes. It then presents tabular descriptions of major ship route envelope dimensions and the density of ships along those routes. The study was done to produce a mathematical description of shipping density for use in various mathematical models. The format, being tabular, is not well suited for use in operational planning. It is, however, the only source now available concerning statistical shipping density in the open ocean.

REFERENCE NUMBER 4.12

TITLE: ATLAS OF SEA AND SWELL CHARTS

PUBLISHER/ID NO.: NAVOCEANO/HOP 799 (Series)

DISTRIBUTOR/ID NO.: DMAHC/NOPUB799CE (WEST PACIFIC)
DMAHC/NOPUB799D (NORTHEAST PACIFIC)
DMAHC/NOPUB799G (INDIAN OCEAN)

DATE: 1944

ORDERING KEY: V-2

REGION COVERED: 60°S-60°N, 110°E-165°W (W. PAC)
0°-60°N, 160°W-075°W (N.E. PAC)
50°S-25°N, 010°E-130°E (IND. OC.)

DOCUMENT SIZE: 31" x 25"

PARAMETERS/FORMAT:

SEA AND SWELL/Monthly charts with double roses at selected locations. One of the pair gives sea height and frequency by direction, the other gives the same for swell. Number of monthly calms and number of observations are given with each rose.

COMMENTS:

The above charts are largely superseded by presentations in Atlases 1.1 and 1.2, which are much more recent and based on a much larger data base. This reference is included only because the charts are much larger scale. Their size, however, also makes them difficult to store.

REFERENCE NUMBER 4.13

TITLE: WAVE CLIMATOLOGY AS AN AID TO SHIP ROUTING

**PUBLISHER/ID NO.: NAVOCEANO/TR-219 (PACIFIC)
NAVOCEANO/TR-192 (INDIAN OCEAN)**

**DISTRIBUTOR/ID NO.: DMAHC/TRPUB219
DMAHC/TRPUB192**

DATE: 1967, 1969

ORDERING KEY: V-2

**REGION COVERED: 0°-65°N, 120°E-075°W (PACIFIC)
40°S-25°N, 010°E-130°E (INDIAN)**

DOCUMENT SIZE: 8-1/2" x 10" x 50 pages

PARAMETERS/FORMAT:

For each of four seasons, eight charts are presented; each chart is for a particular ship heading. The charts have isopleths of the percent of ships that have reported being slowed due to adverse seas. The charts do not give good estimates of the frequency of adverse conditions, however, because ships seek to avoid them, and they are not reported equally.

REFERENCE NUMBERS 4.14, 4.15 & 4.16

TITLE: SURFACE CURRENTS

PUBLISHER/ID NO.: NAVOCEANO/SP1402 (NO. PACIFIC)
NAVOCEANO/SP1403 (SO. PACIFIC)
NAVOCEANO/SP1404 (INDIAN OCEAN)

DISTRIBUTOR/ID NO.: DMAHC/SPPUB1402 - (NP-xx)
DMAHC/SPPUB1403 - (SP-xx)
DMAHC/SPPUB1404 - (IN-xx)
(xx = Standard Navy Ocean Area Number)

DATE: 1977

ORDERING KEY: V-2

REGION COVERED: PACIFIC AND INDIAN OCEANS NORTH OF 55°S

DOCUMENT SIZE: 9-1/2" 14" x 20 pages (soft-cover)

PUBLICATION SERIES FORMAT:

Each of the above three publications is composed of a series of volumes. Each volume corresponds to one of the Standard Navy Ocean Areas in the respective ocean. The appropriate ocean area numbers may be found in DIRNAVOCEANMETINST 3160.4 (Ch. 1).

PARAMETERS/FORMAT:

Each volume contains 12 monthly and four quarterly-summary charts. Each chart is partitioned into 1° quadrangles, each containing the following data:

- Total number of observations
- Number of calms (no current observed)
- Mean observed current speed
- Mean vector resultant of all observed currents
- Percent frequencies of primary and secondary currents
- Mean speeds in primary and secondary directions
- Number of observations by compass quadrant

REFERENCE NUMBER 4.17

TITLE: OCEAN CURRENTS IN THE VICINITY OF THE JAPANESE ISLANDS AND THE CHINA COAST

PUBLISHER/ID NO.: NAVOCEANO/Pub. No. 237

DISTRIBUTOR/ID NO.: DMAHC/NOPUB237

DATE: 1964

ORDERING KEY: V-2

REGION COVERED: 24°N-47°N, 115°E-145°E

DOCUMENT SIZE: 11" x 10" x 18 pages

PARAMETERS/FORMAT:

SURFACE CURRENT/Monthly charts showing prevailing current directions and speeds with arrows and numerical speed indications. Wind roses in each 5° quadrangle.

REFERENCE NUMBER 4.18

TITLE: CURRENTS IN THE SOUTH CHINA, JAVA, CELEBES, AND SULU SEAS

PUBLISHER/ID NO.: U.S. HYDROGRAPHIC OFFICE/H.O. Pub. No. 236

DISTRIBUTOR/ID NO.: DMAHC/HOP236

DATE: 1945

ORDERING KEY: V-2

REGION COVERED: 10°S-25°N, 100°E-125°E

DOCUMENT SIZE: 8" x 10-1/2" x 15 pages

PARAMETERS/FORMAT:

SURFACE CURRENTS/Monthly charts showing prevailing current directions and speeds by arrows and numerical speed indicators. Wind roses in each 5° quadrangle.

REFERENCE NUMBER 4.19

TITLE: MAJOR CURRENTS OFF THE WEST COASTS OF NORTH AND
SOUTH AMERICA

PUBLISHER/ID NO.: NAVOCEANO/TR-221

DISTRIBUTOR/ID NO.: DMAHC/TRPUB221

DATE: 1969

ORDERING KEY: V-2

REGION COVERED: INTERMITTENTLY ALONG AMERICAS' WEST COASTS
IN AREAS OF PERMANENT CURRENTS

DOCUMENT SIZE: 8" x 10-1/2" x 34 pages

PARAMETERS/FORMAT:

For each of eight areas having permanent currents, the report provides a description of the behavior, boundaries, speeds, directions, and in some cases the change of flow with depth of the current. The report is primarily narrative with few graphics.

REFERENCE NUMBER 4.20

TITLE: SURFACE SEDIMENTS AND TOPOGRAPHY OF THE NORTH PACIFIC OCEAN

PUBLISHER/ID NO.: SCRIPPS INSTITUTION OF OCEANOGRAPHY/
IMR-TR (Series)

DISTRIBUTOR/ID NO.: SCRIPPS INSTITUTION OF OCEANOGRAPHY/
IMR-TR (Series)

DATE: 1972

ORDERING KEY: V-8

REGION COVERED: 0°-60°N, 100°E-077°W

DOCUMENT SIZE: 23" x 35"

PARAMETERS/FORMAT:

The document consists of ten loose charts that, in aggregate, cover the above described region.

The bottom type is indicated on each chart by color-coded areas. Seven basic sediment types are distinguished; colors and sediment symbols are mixed or superposed in areas of multiple composition.

The charts also contain bathymetric contours at 200 fathom intervals.

REFERENCE NUMBER 4.21

**TITLE: HIGH FREQUENCY BOTTOM LOSS PROVINCES IN THE NORTHERN
HEMISPHERE (U) (CONFIDENTIAL)**

PUBLISHER/ID NO.: NAVOCEANO/NOO SP-217

DISTRIBUTOR/ID NO.: DMAHC/SUPPUB217

DATE: 1976

ORDERING KEY: V-2

REGION COVERED: OCEANS OF NORTHERN HEMISPHERE TO 79°N

DOCUMENT SIZE: 8" x 10-1/2" x 26 pages

PARAMETERS/FORMAT:

The report defines nine bottom-type categories and plots regions where each prevails. The bottom-types are distinguished by their reflectivity of sound in the 1-3.5 kHz range.

REFERENCE NUMBER 4.22

TITLE: NAVAL WARFARE PLANNING CHART BASE - ASW PREDICTION
AREAS (U) (CONFIDENTIAL)

PUBLISHER/ID NO.: DMAHC/(Series No.) - 2401

DISTRIBUTOR/ID NO.: DMAHC/(Series No.) - 2401

DATE: VARIOUS WITHIN SERIES

ORDERING KEY: V-2

REGION COVERED: IN AGGREGATE, SERIES COVERS WORLD'S OCEANS

DOCUMENT SIZE: Each chart is 15" x 20" (Small) or
36" x 54" (Large)

PARAMETERS/FORMAT:

Each chart covers one of the Standard Navy Ocean Areas identified in DIRNAVOCEANMETINST 3160.4 (Ch. 1). On each, the charted area is divided into segments called ASW Prediction Areas. These areas, having homogeneous acoustic characteristics, are numbered to correspond to ASRAP and SHARPS forecasts. Tabulations give, for each area, the bottom-loss class, mean depth, and mean deep depth. The charts have overlaid bathymetric contours at 500 fathom intervals (100 and 300 fathoms in shallower areas) and indicate the depth of sea mount peaks.

REFERENCE 4.23

TITLE: ICE ATLAS OF THE BERING SEA, SEA OF OKHOTSK AND SEA OF JAPAN (U) (SECRET)

PUBLISHER/ID NO.: NAVOCEANO/N.O. P-1201

DISTRIBUTOR/ID NO.: DMAHC/NOPUB1201

DATE: 1974

ORDERING KEY: V-2

REGION COVERED: BERING SEA, SEA OF OKHOTSK AND SEA OF JAPAN NORTH OF 40°N

DOCUMENT SIZE: 15" x 10" x 160 pages

PARAMETERS/FORMAT:

Presentations are all graphic. There are two series of charts (one for the Bering Sea, the other for the Sea of Okhotsk and northern Sea of Japan). Each series contains 24 semimonthly sets of three charts each. The three charts in each set indicate the limits (max, min, mean), the concentration, and the age of ice in the region covered.

REFERENCE NUMBER 4.24

TITLE: COMPONENTS OF THE 1000 MILLIBAR WINDS IN THE NORTHERN
HEMISPHERE

PUBLISHER/ID NO.: CNO/NAVAIR 50-1C-51

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-51

DATE: 1966

ORDERING KEY: V-1

REGION COVERED: NORTHERN HEMISPHERE

DOCUMENT SIZE: 13-1/2" x 20" x 85 pages (hard-cover)

PARAMETERS/FORMAT:

All presentations are monthly and contain charts or
tables.

MEAN ZONAL WIND COMPONENT/
MEAN MERIDIONAL WIND COMPONENT/
STANDARD DEVIATION OF ZONAL
COMPONENT/
STANDARD DEVIATION OF MERIDIONAL
COMPONENT/

} Isopleths (2 knots)
of each parameter.

MEAN ZONAL COMPONENT/
MEAN MERIDIONAL COMPONENT/

} Numerics at inter-
sections of 63 x 63
grid.

COMMENTS:

As no measure of correlation between zonal and meridional
components is given, wind direction and speed distribution
cannot be calculated. The document is more pertinent to
weather researchers than Naval Planners.

REFERENCE NUMBER 4.25

TITLE: UPPER WIND STATISTICS CHARTS OF THE NORTHERN
HEMISPHERE

PUBLISHER/ID NO.: CNO/NAVAER 50-1C-535

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAER 50-1C-535

DATE: 1959, 1962

ORDERING KEY: V-1

REGION COVERED: NORTHERN HEMISPHERE

DOCUMENT SIZE: 15" x 22-1/2" x 200 pages (hard-cover
loose-leaf)

PARAMETERS/FORMAT:

Quarterly charts, showing isopleths of the following
parameters at the 850, 700, 500, 300, 200, 100, and 50
millibar levels:

- Vector mean wind speed
- Vector mean wind direction
- Vector standard deviation
- Zonal mean wind speed
- Standard deviation of zonal wind speed
- Meridional mean wind speed
- Standard deviation of meridional wind speed
- Zonal-Meridional correlation
- Angular rotation of major axis
- Major axis standard deviation
- Minor axis standard deviation
- Scalar mean wind speed
- Standard deviation of scalar speed
- Constancy (Vector Mean Speed/Scalar Mean Speed)

REFERENCE NUMBER 4.26

TITLE: CLIMATE OF THE UPPER AIR - SOUTHERN HEMISPHERE

PUBLISHER/ID NO.: NCAR, NSF, NOAA/NAVAIR 50-1C-55, 56, 57, 58

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-55, 56, 57, 58

DATE: 1969-1971

ORDERING KEY: V-1

REGION COVERED: SOUTHERN HEMISPHERE

DOCUMENT SIZE: 12-1/2" x 19"

PARAMETERS/FORMAT:

The document is composed of four volumes, as indicated by the publisher's ID numbers. Each volume contains charts relating to different variables. Most of the charts are intended for researchers and are not described here. Volume III (NAVAIR 50-1C-57), however, does have quarterly charts with isopleths of wind speed and direction at 1000, 850, 700, 500, 300, 200, and 100 millibar levels.

The contents of each volume are as follows:

Vol. I, NAVAIR 50-1C-55, Temperatures, Dew-Points
and Heights

Vol. II, NAVAIR 50-1C-56, Zonal Geostrophic Winds

Vol. III, NAVAIR 50-1C-57, Vector Mean Geostrophic
Winds

Vol. IV, NAVAIR 50-1C-58, Selected Meridional Cross
Sections

REFERENCE NUMBER 4.27

TITLE: PACIFIC OCEAN CLOUDINESS FROM SATELLITE OBSERVATIONS

PUBLISHER: UNIVERSITY OF HAWAII

DISTRIBUTOR: UNIVERSITY OF HAWAII

DATE: 1976

ORDERING KEY: V-10

REGION COVERED: Pacific Ocean (30°S-60°N, 105°E-075°W)

DOCUMENT SIZE: 14" x 17" x 133 pages

PARAMETERS/FORMAT:

The document consists almost entirely of isopleth analyses upon a Pacific Ocean chart background. All charts represent cloud cover in octas, and include:

- Monthly charts of mean long-term cloudiness
- Month-to-month changes in long-term mean cloudiness
- Standard deviation of daily cloudiness
- Time-latitude cloudiness cross sections
- Average cloudiness for each month in the period
February 1965 to July 1973
- Individual monthly anomalies from the long-term means

REFERENCE NUMBER 4.28

TITLE: STUDY OF WORLD-WIDE OCCURRENCE OF FOG, THUNDERSTORMS,
SUPERCOOLED LOW CLOUDS, AND FREEZING TEMPERATURES

PUBLISHER/ID NO.: NAVWEASERV/NAVAIR 50-1C-60

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-60

DATE: 1971

ORDERING KEY: V-1

REGION COVERED: WORLDWIDE BETWEEN 75°S-75°N

DOCUMENT SIZE: 10" x 15" x 70 pages (soft-cover)

PARAMETERS/FORMAT:

FOG/Monthly charts with frequency isopleths of occurrence

SUPERCOOLED FOG/Monthly charts with frequency isopleths
of occurrence.

THUNDERSTORMS/Monthly and quarterly charts with isopleths
of number of days per month or quarter with thunder-
storms reported.

CLOUDS/Quarterly charts with frequency isopleths of
occurrence of supercooled stratus and low cumulus.

TEMPERATURE/Quarterly charts with isopleths of mean
height of freezing level.

REFERENCE NUMBER 4.29

TITLE: MARINER'S WORLD-WIDE CLIMATIC GUIDE TO TROPICAL STORMS AT SEA

PUBLISHER/ID NO.: COMNAVWEASERV/NAVAIR 50-1C-61

DISTRIBUTOR/ID NO.: NAVPUBFORMCEN/NAVAIR 50-1C-61

DATE: 1974

ORDERING KEY: V-1

REGION COVERED: WORLD'S OCEANS

DOCUMENT SIZE: 10" x 15" 425 pages (hard-cover)

PARAMETERS/FORMAT:

The document contains substantial narrative material regarding the formation and movement of storms and the relation of storms and their movement to ship handling. It also presents the following climatological data for each of the world's three major ocean basins:

MEAN STORM TRACKS/Charts for varying time intervals
having: arrows showing primary storm tracks;
isopleths of mean movement speed; in 5° quadrangles,
numerical direction constancy and occurrence
probability.

MOVEMENT ROSES/For each of four intensity stages,
monthly charts with roses in 5° quadrangles indi-
cating frequency and speed by direction and numerical
mean speed and occurrence probability.

REFERENCE NUMBER 4.30

TITLE: TYPHOON HAVENS HANDBOOK FOR THE WESTERN PACIFIC AND
INDIAN OCEANS

PUBLISHER/ID NO.: NEPRF/Technical Paper 5-76

DISTRIBUTOR/ID NO.: NEPRF/Technical Paper 5-76

DATE: 1976

ORDERING KEY: V-7

REGION COVERED: Ports in the Western Pacific and Indian Ocean

DOCUMENT SIZE: 8-1/2" x 11" loose-leaf

PARAMETERS/FORMAT:

The document contains a general discussion of the origin, development, movement, characteristics, and effects of tropical cyclones. It then presents, for each of the harbors listed below, a detailed discussion of their suitability as typhoon havens. The ports addressed are:

GUAM/Apra Harbor
TAIWAN/Kaosiung, Chilung Harbors
HONG KONG/Hong Kong Harbor
JAPAN/Yokosuka, Numazu OPAREA, Iwakuni, Kure,
Sasebo, Kagoshima Harbors
OKINAWA/Buckner Bay, Naha Harbors
PHILIPPINES/Subic Bay, Manila Harbor, Cebu Harbor
SRI LANKA/Colombo Harbor
AUSTRALIA/Fremantle Harbor
NEW ZEALAND/Auckland Harbor
KOREA/Inchon, Pusan, Chinhae Harbors
DIEGO GARCIA/Diego Garcia Harbor

PART V

PUBLICATION ORDERING INSTRUCTIONS

1. NAVY PUBLICATIONS AND FORMS CENTER. Documents distributed by this agency are available through standard Navy supply channels. Activities should consult NAVAIR Allowance List, Section "L", Part 4, NAVAIR 00-35QL-22, for index numbers of desired publications. They should then be requisitioned in accordance with procedures set forth in NAVSUP 2002, Section VIII, Part C.

2. Defense Mapping Agency, Hydrographic Center. Documents distributed by DMAHC should be requisitioned through the DMA Automated Distribution Management System, by means of one of the following requisition forms:

1. DD Form 1348m (Single-line item, mechanical)
2. DD Form 1348 (Single-line item, manual)
3. SF 344 (Multiuse Requisition Document)
4. DD Form 173 (Joint Message Form Requisition)

Under normal circumstances, the completed requisition forms should be transmitted by mail, or DD Form 1348m by AUTODIN, to the DMA Distribution Control Point:

DMA Distribution Control Point
DMA Topographic Center
ATTN: DDCP
6500 Brookes Lane
Washington, D.C. 20315

Message address: DMATC WASHINGTON DC

In the event of immediate operational requirements, requisitions may be sent by mail or AUTODIN, or may be hand carried for over-the-counter delivery, to one of the Depots designated below:

- a. DMA Hydrographic Center San Diego Office
Naval Air Station, North Island
San Diego, CA 92135

Message address: DMAHC OFFICE SAN DIEGO CA

- b. DMA Hydrographic Center Cubi Point Office
Box 59
Naval Air Station, Cubi Point
Republic of the Philippines
FPO San Francisco 96654

Message address: DMAHC OFFICE CUBI POINT RP

- c. DMA Hydrographic Center Atsugi Office
Box 47
Naval Air Facility, Atsugi, Japan
FPO Seattle 98767

Message address: DMAHC OFFICE ATSUGI JA

- d. DMA Depot, Hawaii
APO San Francisco 96553

Message address: DMA DEPOT HAWAII HICKAM AFB HI

3. U.S. GOVERNMENT PRINTING OFFICE. Documents distributed
by this agency may be ordered from:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

4. FLEET WEATHER CENTRAL, PEARL HARBOR. Documents published
and distributed by this activity may be requested by mail,
message, telephone, or personal visit:

Mail address:

Commanding Officer
Fleet Weather Central
Pearl Harbor, HI 96860

Message address: FLEWEACEN PEARL HARBOR HI

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(AUTOVON): (315) 471-0145

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Alexandria, VA 22314

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6. NAVAL UNDERWATER SYSTEMS CENTER. Documents distributed by this agency may be requested from:

Commanding Officer
New London Laboratory
Naval Underwater Systems Center
New London, CT 06320

7. NAVAL ENVIRONMENTAL PREDICTION RESEARCH FACILITY. Documents distributed by this activity may be requested from:

Commanding Officer
Naval Environmental Prediction Research Facility
Monterey, CA 93940

8. SCRIPPS INSTITUTION OF OCEANOGRAPHY. Documents distributed by this institution may be ordered from:

University of California, San Diego
Scripps Institution of Oceanography
Marine Physical Laboratory
San Diego, CA 92152

9. NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY. Documents distributed by NORDA may be requested from:

Naval Ocean Research and Development Activity
NSTL
Bay St. Louis, MS 39520

10. UNIVERSITY OF HAWAII. Documents may be ordered from:

Department of Meteorology
University of Hawaii
Honolulu, HI 96822



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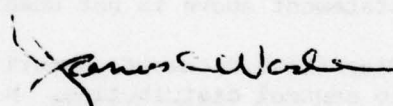
30 JAN 79

SUBJECT: Distribution Statement on Technical Documents

TO: U.S. Pacific Fleet
Commander Third Fleet
Pearl Harbor, Hawaii 96860

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2. You are requested to indicate the proper distribution statement on the reverse of this letter. As a factor in your decision, reports should not be limited in distribution unless required for a valid and specific reason.
3. Request you forward your reply within 10 working days. Delay in responding will result in denying availability of this report to qualified users.

FOR THE ADMINISTRATOR:


JAMES C. WADE
Chief, Accessions Division

SOURCE: (Prepared by): U.S. Pacific Fleet, Commander Third Fleet
Pearl Harbor, Hawaii
TITLE: "Operational Planner's Guide to Climatological Data Sources"
REPORT NO.: Tactical Memorandum 610-3-78
CONTRACT/GRANT NO.: N/A
DATE OF REPORT: 3 Jan 79

FL-182
SEP 78

File

FROM: Commander THIRD Fleet

DATE: 6 February 1979

TO: DDC-DD

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